Cost / Schedule Executive Session Director's CD-2/3a Review of the MINERvA Project

August 1-3, 2006

L. Edward Temple, Jr.

Agenda

Wednesday, August 2, 2006 (Morning break will be available outside Comitium at 10:30)

8:00 – 8:30 AM	30	Cost & Schedule Executive Session (Comitium – WH2SE)	Ed Temple
8:30 – 12:30 PM		Breakout Sessions	
		• WBS 1, 2 & 4 Scintillator & Fiber (Snake Pit – WH2NE)	Anna Pla, TJ Sarlina
		• WBS 3, 8 & 9 Module/Plane, Detector Parts Assembly (Black Hole – WH2NW)	Jim Kilmer, Bob Bradford
		• WBS 5, 6 & 7 PMT's, PMT Boxes and Electronics & DAQ (Racetrack – WH7X)	Vittorio Paolone, Ron Ransome
		• WBS 10 Management/Cost/Schedule (Comitium WH2SE)	Deborah Harris, Nancy Grossman
12:30 – 1:30 PM		LUNCH (WH2X)	
1:30 – 2:30 PM		MINERvA's response to review committees questions (Comitium – WH2SE)	Deborah Harris, Nancy Grossman
2:30 – 6:00+ PM (Break at 3:45)		Executive Session and Report Writing (Comitium – WH2SE)	Ed Temple

Thursday, August 3, 2006

9:00 – 1:30 PM	Closeout Dry Run with working lunch (Comitium – WH2SE) Breaks taken as necessary.	Committee
1:30 PM	Closeout (1 West – WH7X)	

Cost/Schedule Review Guidance

These are CD-2 Requirements.

The cost/schedule reviews are key elements of the CD-2 Performance (Technical, Cost, Schedule) Baseline Reviews.

1) This Director's Review
2)Lehman DOE Review
3)EIR – External Independent Review?

Project Technical, Cost, and Schedule Baseline Development

To Succeed in Cost / Schedule Arena

Estimate must be
- **Complete**
  - Scope well understood and defined
    - Technical goal must be clear
    - Technology to be used to meet this goal known
    - Designate how technical systems will be acquired
      - I.e. buy, have fabricated, self fabricated
      - Buy parts / fabricate / assemble
    - How will this be accomplished
      - Self fabricate / assemble – lab or university(ies)
      - How will person power requirements be met
        - And paid for
  - All tasks defined and specified in a work breakdown structure
  - WBS dictionary
- **Documented** at lowest level of WBS and include
  - M&S – materials and services
  - SWF – salaries, wages, & fringes
  - Accompanied by schedule showing appropriate durations
  - Adders – overheads / G&A (general & administrative)
  - Escalated – shown both with and without escalation with funding profile based on laboratory/DOE/Federal budget/appropriation guidance

Cost/Schedule Review Guidance

(Continued)

Reviewable

Estimate must "roll-up" from the lowest level to the total and reviewers must be able to drill down from the top to the lowest level

Credible

Basis of estimate must be specified

- Catalog prices
- Similar work, where cost is documented
- Engineering estimates
- WAG – wild ass guess

This material forms basis for DOE approving a baseline, for Fermilab/Collaboration Project Management to measure performance and take appropriate corrective actions during execution and for Laboratory Management and DOE to monitor progress.

Cost/Schedule Review Guidance

(Continued)

Baseline Reviews

When preparing a baseline, it can be helpful to be aware of and prepared for the types of things a Director's Technical/Cost/Schedule/Management Review Committee or a DOE Baseline Review Committee will be looking for. The following provides some insight into such reviews. Review Committees are frequently broken up into subgroups which are then assigned to look at specific systems or subprojects within a project.

To be available for reviewers one week prior to the review

- Conceptual &/or Technical Design Reports
- Design Review materials (web address was provided)
  - Materials presented at most recent design review for system
- Detailed schedule for system (to be looked at during breakout sessions)
- Cost Estimate Details for system (will be provided at low levels of the WBS)
  - Including WBS Dictionary and BOE – Basis of Estimate detail sheets
  - (BOE notebooks will be available in breakout rooms)

Tabbed hardcopies of review materials and presentations to be available at the review. Enough for committee, observers, and a half dozen extras

Cost/Schedule Review Guidance

(Continued)

Technical / Cost / Schedule / Management Review Guidelines
(things reviewers are asked to do)

Technical

Examine Design Review Materials (including TDRs & CDRs) for your system
- Assess level at which **scope is understood and defined**
- Assess level that **technical aspects of the system are understood, planned, designed, procured/fabricated and/or prototyped**

Cost

Choose >~5 top level WBS elements from your system
- *Drill down* to successively lower levels of the WBS; while at each step
  - Understanding the **scope** of that element
  - Understanding the **schedule** for that element
  - Understanding the **basis of estimate** (BOE) for **both M&S and effort** for that element
  - Choose a few elements next lowest level of the WBS
    - And repeat this procedure until you get to the bottom level.
    - I.e., the lowest level of the WBS

Choose >~5 items in the system for which you have personal experience
- Interact with the responsible managers to **determine if**
  - **The Estimate is complete, documented, reviewable, and credible**

Cost/Schedule Review Guidance

(Continued)

Check that there is **a detailed BOE for all work elements** in your system

Check whether the **estimate for your system "rolls-up"** from the lowest level WBS element to the total for your system

Does each level of the WBS contain all costs from lower level WBS elements

Assess the **"bottoms up" contingency that the WBS level 3 managers would assign** their components.

Assess the **"top down" contingency analysis assignments by the Project Manager**

Schedule

Is there a detailed schedule, including a critical path, for completing the project? Are milestones appropriate in number and type identified so that the project teams, Fermilab management, and DOE can effectively track and manage progress? Based on past experience, can the proposed schedules be met? Are appropriate schedule contingencies provided? Is there a "resource loaded schedule" and plan for providing the needed resources (M&S and technical support staff and physicists)?

Cost/Schedule Review Guidance

(Continued)

Funding

Have techniques such as forward funding by collaborators and phased funding of large contracts been appropriately incorporated into the planning? Does the anticipated funding profile support the resource requirements?

Management

Is an **appropriate / adequate project organizational structure** in place and **staffed** (or are plans in place) to do the job.

Has the **appropriate project management documentation** been prepared. Is it of a quality adequate for this stage of the project? Are **appropriate / adequate management systems** (Cost and Schedule Control System / Earned Value Reporting, Critical Path Management, Risk Management, etc.) in place or planned for use during project execution?

Reviewer Assignments

Executive Summary	Ed Temple
1.0 Introduction	Dean Hoffer
2.0 Technical	
2.1 Science	Jon Urheim, Jianming Qian
2.2 Scintillator Extrusions, WLS Fiber and Clear Fiber Cables (WBS 1, 2 & 4) WBS 1 – Scintillator Extrusions WBS 2 – WLS Fiber WBS 4 – Clear Fiber Cables	Jianming Qian Jon Urheim
2.3 Plane Assembly, Outer Detector Frame, Absorbers, Stand and Module Assembly (WBS 3, 8 & 9) WBS 3 – Scintillator Plane Assembly WBS 8 – Frame Absorbers & Stand WBS 9 – Module & Veto Wall Assembly	Mike Crisler, Joe Howell
2.4 PMT's and PMT Boxes (WBS 5 &6) WBS 5 – PMT Boxes WBS 6 – PMT Procurement and Testing	Mike Lindgren, Hogan Nguyen
2.5 Electronics & DAQ (WBS 7)	Hogan Nguyen, Stu Fuess
3.0 Project Management (WBS 10)	
3.1 Cost	Marc Kaducak, Ken Domann, Dean Hoffer
3.2 Schedule	Ken Domann, Marc Kaducak, Dean Hoffer
3.3 Management	Elaine McCluskey, Dean Hoffer, Ed Temple

Reviewer Assignments (continued)

4.0 Charge Questions	
4.1 Are the technical specifications clearly stated and documented?	Jon Urheim
4.2 Can the design be built? Does the design meet the technical specifications? Is it a reasonable design?	Jianming Qian
4.3 Does the baseline design meet the project's objectives (mission need)?	
4.4 Is the Work Breakdown Structure (WBS) appropriate for the project scope?	Marc Kaducak / All
4.5 Do the cost estimates for each WBS (or cost) element have a sound documented basis and are they reasonable?	
4.6 Does an obligation profile exist and is it within the funding guidance profile?	
4.7 Is the schedule well developed and appropriately structured by specifying relationships, predecessors, successors, critical path, resource loaded, etc?	Ken Domann / All
4.8 Are the durations for the activities and overall schedule reasonable and achievable with the assumed resources?	
4.9 Does the schedule contain appropriate levels of milestones, sufficient quantity of milestones for tracking progress and do they appear to be achievable?	
4.10 Does the schedule include activities for design reviews, which include assessment of the designs readiness for procuring prototypes, preproduction and production materials?	

Reviewer Assignments (continued)

	4.11 Is there an appropriate management organizational structure in place to accomplish the design and construction?	Elaine McCluskey / All
	4.12 Is the organization structure well documented with responsibilities defined and appropriate for the scope of work?	
	4.13 Are there adequate staffing resources available or planned for this effort?	
	4.14 Is there a funding plan available or proposed to meet the resource requirements to realize the project?	
	4.15 Has a Risk Plan been developed, risks identified, risks analyzed, risks responses planned/implemented, risk monitoring/control process established and do they seem appropriate?	
	4.16 Have the critical procurements been identified and are they included in the schedule with adequate lead time built in?	Dean Hoffer / All
	4.17 Have critical make vs. buy decisions been evaluated in conjunction with the scope and is that reflected in the baseline cost estimate, schedule and technical risk plan?	
	4.18 Are the designs final and procurement packages prepared to the degree appropriate to initiate construction as scheduled?	

* Note underlined names are the primary writer.

Reviewer Assignments for Breakouts

WBS 1, 2 & 4 Scintillator & Fiber (Snake Pit – WH2NE)	Jianming Qian Jon Urheim
WBS 3, 8 & 9 Module/Plane, Detector Parts Assembly (Black Hole – WH2NW)	Mike Crisler Joe Howell
WBS 5, 6 & 7 PMT's, PMT Boxes and Electronics & DAQ (Racetrack – WH7X)	Mike Lindgren Hogan Nguyen Stu Fuess
WBS 10 Management/Cost/Schedule (Comitium WH2SE)	Elaine McCluskey Marc Kaducak Ken Domann Dean Hoffer Ed Temple

Project's Cost & Contingency Estimate

	WBS	Items	MINERvA's Cost Estimate AYk$									
			Base w/Indirects			Contingency %			Contingency $			Total Base
			M&S	Labor	Total	M&S	Labor	Total	M&S	Labor	Total	w/Indirects
MIE	1.0	Scintillator Extrusion	121	268	$ 389	19%	25%	23%	$ 24	$ 67	$ 90	$ 480
	2.0	WLS Fibers	350	374	$ 724	30%	21%	25%	$ 104	$ 80	$ 183	$ 907
	3.0	Scintillator Plan Assembly	208	655	$ 864	48%	29%	34%	$ 99	$ 192	$ 292	$ 1,155
	4.0	Clear Fiber Cables	358	727	$ 1,085	30%	37%	35%	$ 109	$ 267	$ 376	$ 1,461
	5.0	Photomultiplier Tube Boxes	148	395	$ 543	21%	30%	28%	$ 31	$ 119	$ 150	$ 693
	6.0	Photomultiplier Tubes	1,114	194	$ 1,308	33%	37%	34%	$ 367	$ 72	$ 439	$ 1,747
	7.0	Electronics and DAQ	922	101	$ 1,024	35%	40%	35%	$ 322	$ 41	$ 363	$ 1,387
	8.0	Frames, Absorbers, Coil and Detector Stand	418	133	$ 552	31%	28%	30%	$ 129	$ 37	$ 166	$ 718
	9.0	Module and Veto Wall Assembly & Installation	160	238	$ 398	37%	20%	27%	$ 60	$ 49	$ 108	$ 506
	10.0	Project Management	62	1,230	$ 1,292	163%	30%	36%	$ 101	$ 369	$ 470	$ 1,762
		Total MIE:	**3,862**	**4,316**	**$ 8,178**	**35%**	**30%**	**32%**	**$ 1,346**	**$ 1,291**	**$ 2,637**	**$ 10,815**
OPC		R&D	1,587	2,794	$ 4,382	41%	35%	37%	$ 648	$ 985	$ 1,633	$ 6,015
		Total OPC:	**1,587**	**2,794**	**$ 4,382**	**41%**	**35%**	**37%**	**$ 648**	**$ 985**	**$ 1,633**	**$ 6,015**
		TPC:	**5,449**	**7,110**	**$ 12,559**	**37%**	**32%**	**34%**	**$ 1,994**	**$ 2,277**	**$ 4,271**	**$ 16,830**

Notes:

Committee's Cost & Contingency Estimate

	WBS	Items	Reviewer's Cost Estimate AY$									
			Base w/Indirects			Contingency %			Contingency $			Total Base w/Indirects and Cont.
			M&S	Labor	Total	M&S	Labor	Total	M&S	Labor	Total	
MIE	1.0	Scintillator Extrusion			$ -	#DIV/0!	#DIV/0!	#DIV/0!			$ -	$ -
	2.0	WLS Fibers			$ -	#DIV/0!	#DIV/0!	#DIV/0!			$ -	$ -
	3.0	Scintillator Plan Assembly			$ -	#DIV/0!	#DIV/0!	#DIV/0!			$ -	$ -
	4.0	Clear Fiber Cables			$ -	#DIV/0!	#DIV/0!	#DIV/0!			$ -	$ -
	5.0	Photomultiplier Tube Boxes			$ -	#DIV/0!	#DIV/0!	#DIV/0!			$ -	$ -
	6.0	Photomultiplier Tubes			$ -	#DIV/0!	#DIV/0!	#DIV/0!			$ -	$ -
	7.0	Electronics and DAQ			$ -	#DIV/0!	#DIV/0!	#DIV/0!			$ -	$ -
	8.0	Frames, Absorbers, Coil and Detector Stand			$ -	#DIV/0!	#DIV/0!	#DIV/0!			$ -	$ -
	9.0	Module and Veto Wall Assembly & Installation			$ -	#DIV/0!	#DIV/0!	#DIV/0!			$ -	$ -
	10.0	Project Management			$ -	#DIV/0!	#DIV/0!	#DIV/0!			$ -	$ -
		Total MIE:	**$ -**	**$ -**	**$ -**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**$ -**	**$ -**	**$ -**	**$ -**
OPC		**R&D**			$ -	#DIV/0!	#DIV/0!	#DIV/0!			$ -	$ -
		Total OPC:	**$ -**	**$ -**	**$ -**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**$ -**	**$ -**	**$ -**	**$ -**
		TPC:	**$ -**	**$ -**	**$ -**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**$ -**	**$ -**	**$ -**	**$ -**

Notes: